National Weather Service, Great Falls

Summer 2006
Spotter Newsletter

BIG SKYWARN

Happy Trails and Best Wishes – Our WCM Moves On

By Connie Thomson, General Forecaster

There has been a change in personnel at the National Weather Service office in Great Falls. On April 16, Rick Dittmann, our Warning Coordination Meteorologist (WCM), reported for his new job as the Meteorologist in Charge (MIC) of the National Weather Service Forecast Office in Pocatello, Idaho.

Rick is a 13 year veteran of the NWS, having started his career as an intern in Albuquerque, New Mexico. He was promoted to a forecaster position there before moving on to work at the Southern Region Headquarters in Fort Worth, Texas. He spent three years at the regional offices, splitting his time between hydrological and meteorological services.

The NWS was undergoing its modernization and restructuring when Rick joined the agency, and a new position was announced – the WCM. From the time he first heard about the position, Rick decided that was what he wanted to do, and did everything he could to prepare himself for that job. After six years, all the hard work paid off when he was selected to be the WCM in Great Falls in 1999.

Being part of the management team for the past seven years, Rick saw the great things that people in the agency do. He knew he wanted to be part of enabling folks to get where they want to go in their careers. He will now get to do that, and more, as the MIC in Pocatello. He says he most looks forward to developing new relationships with his new staff and the customers served by the Pocatello office.

When asked what he would miss most about being the Great Falls WCM, Rick said he'd miss the people – the staff, the spotters, our partners in the media, the DES coordinators – everyone he's worked with. He hopes that his successor enjoys him or herself and enjoys the people as much as he did. "We put a lot of pressures on ourselves," Rick said. "But we can complete our mission and still have fun."

At the time of this writing, the new WCM has yet to be hired. We hope to introduce him or her in our next issue!

www.weather.gov/greatfalls

Inside this issue:

Summer Solstice

June 21 6:26 AM MDT

North Central and Southwest MT Winter-in-Review, November—April
By Dave Bernhardt, Science and Operations Officer

This past winter was fairly typical of Montana winters – one of temperature extremes, warm periods, cold periods, dry periods and snowy periods. November was wet over the southwest portions. Mountain snowpack built up rapidly during the month, with Bozeman/Belgrade airport recording their 4th wettest November of record. Very mild temperatures persisted through most of the month. Near Lewistown, the temperature rose to 74°F on the 11th. Just after Thanksgiving, a record snowfall blanketed the Great Falls vicinity with over 18" of snow. Great Falls also set a November monthly snowfall record, collecting 24.9".

Cold conditions followed through the middle of December. During this period, West Yellowstone fell to –45°F for the coldest December temperature for the area. Snow was mainly confined to the higher elevations. Cut Bank saw their 4th driest December of record. After mid-month, temperatures again swung to the warm side.

This warmth persisted through January, and into early February. January was the warmest January on record for many locations across north central Montana. Even in the southwest, were it was a bit cooler, with more precipitation, Bozeman experienced its 5th warmest January of record. Fort Benton reached 69°F on the 25th for the warmest temperature for the area. Along with the warmth came wind. Several locations felt their windiest January in 15 years.

The windy conditions continued into February, which turned out to be a little more variable. It was generally a dry month, with Bozeman having their driest February of record. This was fairly typical of southwest Montana valley locations, with snow continuing to fall at higher elevations. Though February temperatures were close to normal, a couple of –50°F readings were observed in high mountain valleys. These were the first –50°F or colder temperatures in Montana since 1996.

March again produced variable precipitation amounts. Great Falls saw their highest March precipitation since 1989. It was the 3rd calmest March of record at Cut Bank.

Summarizing the winter, temperatures ranged from slightly below normal in the southwest, to as high as 5 degrees above normal in north central Montana (see Figure 1). Precipitation was above normal almost everywhere. Small pockets in eastern Glacier and central Hill counties received below normal precipitation during the winter (Figure 2). Even though there are small dry pockets (through the end of April), Great Falls and Helena saw their wettest winter since 1992.

April brought a lot of much needed rainfall. Some areas had received their normal April precipitation within the first 5 days of the month. At Helena, it was the second wettest April on record.

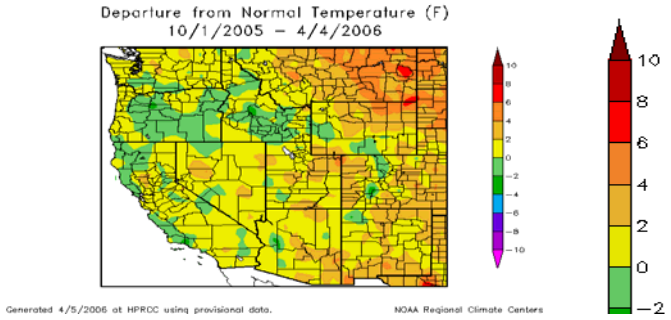


Figure 1. October through March Average °F Temperature Departure from Normal

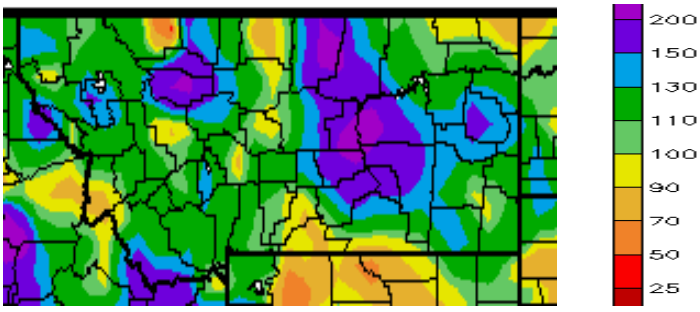


Figure 2. October through March Precipitation Percent of Normal.

(Figures courtesy High Plains Climate Center)

Winter Precipitation Continues to Improve Drought-Affected Areas

By Gina Loss, Service Hydrologist

As the winter brought fairly persistent and, at times, copious precipitation, we continued to slowly overcome the drought conditions across Montana. As of mid-April, there were only six Montana counties that were evaluated by the technical sub-committee of the Governor's Drought Advisory Committee to be in any drought category. Five of these counties, Glacier, Pondera, Big Horn, Powder River and Sheridan, were classified as 'Slightly Dry' and only one county, Carbon, was classified as 'Moderately Dry'. No counties were considered to be either 'Severely Dry' or 'Extremely Dry' (see Figure 1.)

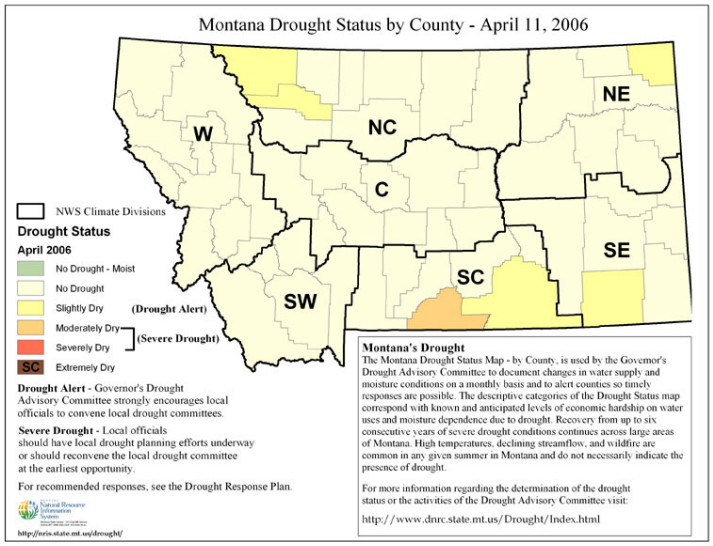


Figure 1. Montana drought status as of April 11, 2006. (Images courtesy of the Montana Natural Resources Information System)

The outlook is optimistic as well. Snowpack peaks were near to above average in every major basin in the state. Soils in the lower elevations were moistened by spring rains and snows. Storage in most reservoirs is near to above average for this time of year. Taking all these factors into consideration, our April to September stream flows are forecast to be near normal across much of the state.

Still, there are areas that are being watched carefully. Many streams and rivers across south central and southeast Montana are fed by Wyoming snowpack, and Wyoming did not fare as well as Montana this past winter. Snowpack in the Wind, Shoshone and Bighorn River Basins peaked between 70 and 75 percent of normal. Snowpack in the Tongue, Powder and Lower Yellowstone River Basins is between 60 and 70 percent of normal. With a lower snowpack feeding the streams and rivers across south central and southeast Montana, the current April through September forecast is for below normal stream flow in these areas. These streams and rivers will be more dependent on rainfall to carry them through the summer months.

So, what might the summer have in store for precipitation? Our wettest months in Montana are May and June. The 90-day outlooks issued by NOAA's Climate Prediction Center for the May-June-July period are showing 'no skill' in forecasting any trend in precipitation. In other words, there are basically equal chances of receiving either above, below or near normal precipitation. For now, we can celebrate what we've received, monitor future trends and hope for some improvement where it is needed.

Big Skywarn is now available online - everything in our printed version, plus more!

www.weather.gov/tfx/pdfs/summer06.pdf

Pyrocumulus Clouds

By Bob Hoenisch, General Forecaster

Cumulus and cumulonimbus clouds are commonly seen across the Big Sky State and most weather watchers can identify the small puffy fair-weather cumulus clouds and large cumulonimbus clouds which are thunderstorms. Pyrocumulus clouds are rare but do occur occasionally in association with large wildfires.

Like other cumulus clouds, Pyrocumulus clouds develop as a result of updrafts.

Fair-weather cumulus clouds are formed by updrafts that develop due to the surface of the earth being heated by the sun. If the air within this updraft rises high enough, it will cool to the point where moisture in the updraft will condense and form a cloud. This point is called the condensation level. Pyrocumulus clouds form in the same way, however the updraft is generated by the heat produced by an ongoing wildland fire. The condensation level is usually very high during the wildfire season, however the heat of a large fire creates very unstable conditions which can lead to strong updrafts above the fire. One of the interesting things about pyrocumulus clouds is that the updraft is visible in the form of the column of smoke rising from the fire. Firefighters often call these clouds "cap clouds" or describe the smoke column as "capping off" when a small pyrocumulus cloud forms above the fire.

Pyrocumulus can be darker in color than other cumulus clouds due to the smoke and ash entrained within the cloud, especially in the lower levels. However, they can also be bright white if enough water vapor is present. The presence of smoke and ash provide an abundance of particles on which moisture condenses, and these clouds often grow and expand rapidly. The size and duration of pyrocumulus clouds can vary greatly, ranging from very small and lasting for only a few minutes to sizes similar to a mature thunderstorm and lasting for an hour or longer. The largest pyrocumulus clouds develop when a wildland fire undergoes rapid growth, burning several thousand acres in a short period. (continued on next page)

Pyrocumulus Clouds, continued

These are often called “blow-up fires”, and the heat generated under these conditions can create pyrocumulus clouds that reach as high into the atmosphere as thunderstorms. While rare, these massive pyrocumulus clouds can produce lightning, which may start additional fires.

Another danger from large pyrocumulus clouds are winds. Like thunderstorms, when the updraft weakens and can no longer sustain the cloud, it will collapse, causing strong gusty winds.

Smaller pyrocumulus clouds are more common and do not pose any threat, while the larger pyrocumulus clouds are rare and associated with fire behavior that is already extreme. While pyrocumulus clouds are most commonly associated with wildfires, they can also form in association with volcanic eruptions.

Noctilucent Clouds

Noctilucent clouds (popularly referred to by the abbreviation "NLC") are high atmosphere cloud formations thought to be composed of small ice-coated particles; their precise nature remains a mystery. They form at very high altitudes – around 50 miles or 82 km above sea level - and are, thus, a quite separate phenomenon from normal weather or tropospheric clouds.

NLCs are very tenuous in nature and are only visible against a twilit sky background when the clouds occupy a sunlit portion of the Earth’s atmosphere. They are never seen in daylight skies. Therefore, the best time to look for NLC is during the deep twilights of summer when the sun lies between 6 - 16 degrees below the horizon. Each year, NLC incidence tends to peak just prior to and for a few weeks after the summer solstice (from each hemisphere).

(continued on next page)

Noctilucent Clouds, continued

Normal visibility limits for northern hemisphere observers are from mid-May to mid-August though they are occasionally reported outside of this timeframe.

The twilight conditions which render NLC visible impose a latitude restriction on their visibility. They are, therefore, most often seen from locations which lie between Latitude 50 and 60 degrees in both hemispheres (though they are occasionally reported beyond this latitude band). Through most of June and July (from the northern hemisphere) these locations never attain true astronomical darkness and twilit skies persist all night. The latitude range takes in Northern America, Canada and Northern Europe. Very few populated land masses exist at the corresponding latitudes in the southern hemisphere.

Generally NLC will be seen close to the sunward horizon, perhaps extending to around 15 - 20 degrees above the horizon, along the twilight arch. They can be more extensive (on rare occasions encroaching the equatorward half of the sky) close to dusk and dawn when the solar illumination is most favorable. Similarly, at local midnight, the NLC is poorly illuminated and the cloud sheet, if present, will recede closer to the horizon.

They appear as complex interwoven streaks or knots of "cloud". Color is generally white or a distinctive pearly-blue tone, sometimes with a golden lower edge. Structure is reminiscent of daytime cirrostratus formations.

At times high cirrus clouds can appear to be brighter than the twilit background, especially when a bright moon is present or local light pollution problems are extreme. Experienced observers generally have no trouble in identifying true NLC. Binoculars can assist in correct identification; cirrus cloud tends to be nebulous when viewed through binoculars while NLC bears magnification, showing finer detail which the naked eye would otherwise be unable to resolve. Bright displays of NLC are quite unmistakable and can be an awe-inspiring sight.

More information can be found on this web site, http://www.nlcnet.co.uk/. There are instructions on how to observe NLC and how you can report your observations on this site. The reports are used in a study of NLC formations and what may cause them.

Severe Weather Safety Tips

By Jim Brusda, General Forecaster

Severe weather and flooding can be dangerous and life threatening if you don't take the necessary precautions to protect yourself. The National Weather Service issues several different kinds of statements to warn of any weather related danger.

A **WATCH** is issued when the risk of a hazardous weather or hydrologic event has increased significantly, but its occurrence, location, and/or timing is still uncertain. It is intended to provide enough time so those who need to set their plans in motion can do so. *Watches evolve into warnings, advisories, or they are canceled.*

A **WARNING** is issued when a hazardous weather or hydrologic event is occurring, is imminent, or has a very high probability of occurrence. A warning is used for conditions posing a threat to life or property. The NWS is the single "official" voice when issuing warnings for life-threatening situations.

An **ADVISORY** is for less serious conditions that can cause significant inconvenience and, if caution is not exercised, could lead to situations that may threaten life and/or property.

A **SEVERE THUNDERSTORM WARNING** is issued by the National Weather Service when a severe thunderstorm is occurring, is imminent, or has a high probability of occurring. A severe thunderstorm produces wind gusts of 58 mph or stronger and/or hail that is penny size (3/4" of an inch) or larger.

A **TORNADO WARNING** is issued by the National Weather Service when a tornado is occurring, is imminent, or has a high probability of occurring.

A **FLASH FLOOD WARNING** signifies a dangerous situation where rapid flooding of small rivers, streams, creaks, or urban areas is imminent or already occurring. Very heavy rain that falls in a short time period can lead to flash flooding, depending on local terrain, degree of urbanization, degree changes to river banks, and initial ground or river conditions.

Of course, the best safety tip is to always be prepared and to be aware of the latest weather forecasts. This way you can prevent the chances of finding yourself in a life threatening situation.

Here's a hail size conversion chart for when you don't have a ruler handy. Hail size is very important to us and your reports help us immensely!

Hail Size	Description
0.25 inch	Pea Size
0.50 inch	Dime or Mothball Size
0.75 inch (Severe Criteria)	Penny Size
0.88 inch	Nickel Size
1.00 inch	Quarter Size
1.25 inch	Half Dollar Size
1.50 inch	Walnut or Ping Pong Ball Size
1.75 inch	Golf Ball Size
2.00 inch	Hen Egg Size
2.50 inch	Tennis Ball Size
2.75 inch	Baseball Size
3.00 inch	Teacup Size
4.00 inch	Grapefruit Size
4.50 inch	Softball Size

Tornado Myth and Reality

By John Blank, Lead Forecaster

TRUE OR FALSE…

1. When traveling by car seek shelter under an overpass.
FALSE: Winds actually are stronger underneath the overpass than away from the overpass. This increased speed combined with flying debris actually INCREASES the risk of injury or death. Of one group of 17 people taking refuge under an overpass during the May 3, 1999, killer tornado that struck Oklahoma City, all but one were thrown outside the overpass, and one in the group was killed. Another group of people was huddled under another overpass from the same tornado. In that group several suffered severed limbs, and others had broken bones and deep lacerations.

2. Mobile homes attract tornadoes.
FALSE: Mobile homes are not more likely to be hit, they are just more vulnerable to wind damage.

3. Cities/hills/rivers deflect or inhibit tornadoes.
FALSE: Tornadoes have been observed crossing the Appalachian Mountains and 30 significant tornadoes have crossed the Mississippi River. Major tornadoes have plowed through Dallas, Kansas City, and Omaha. Several years ago a tornado went through downtown Salt Lake City.

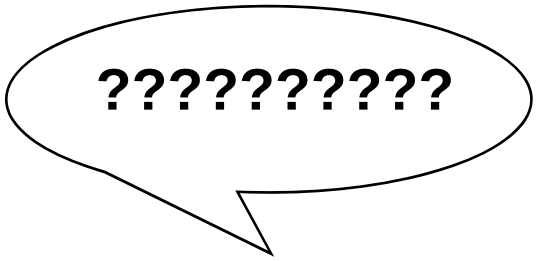
4. **The southwest corner of the house is the safest location during a tornado.**
FALSE: Always go to the lowest level and center of a house during a tornado. A small interior room is structurally the strongest.

5. Tornadoes are the number one weather killer in the U.S.
FALSE: 1975-2004 total fatalities: floods - 2,140; lightning - 1,320; tornadoes - 1300; hurricanes - 300; heat (1984-2004) - 2,596.

6. Tornado damage is caused by rapid reduction in pressure (leave windows open as tornado approaches).
FALSE: Open windows will NOT equalize the air pressure if a tornado strikes. Damage is caused by wind gusts and flying debris.

7. Doppler radar will observe ALL tornadoes.
FALSE: Doppler, although much more accurate than earlier radar, cannot see the very smallest of tornadoes that are "rope-like" in size, plus due to the curvature of the earth, Doppler radar can only see the upper portions of storms that are far from the radar.

8. Cars are safer than mobile homes during a tornado (with no other shelter available).
TRUE…FALSE…WELL, MAYBE. Both are deadly locations but cars might be marginally safer according to researchers. However, the best advice is to abandon both for sturdy shelter!



Ask the Meteorologist

Do you have a question about the weather? Here is your chance to ask the staff at the National Weather Service in Great Falls. Our staff of meteorologists will do our best to answer all of your questions concerning meteorology. Some of the most common or interesting questions and answers will be printed in the next newsletter. If you have a question, please send it to our staff at:

w-gtf.webmaster@noaa.gov

Recent Cooperative Observer Awards
By Rich Prewitt, Cooperative Program Manager

Observer	Station	Length of Service
Russ Barrett	Fairfield	10 Years
Gary Betcher	Choteau	10 Years
Herf Ingersoll	Rogers Pass	10 Years
Ron Jung	Cardwell	10 Years
George Dengal	Grass Range	15 Years
Vince Kolar	Raynesford	15 Years
Terry Sherburne	Summit	15 Years
Regina Givens	Silverstar	20 Years
Gary Gollehon	Brady	20 Years
Ward Scribner	Geraldine	25 Years
David Warner	West Yellowstone	25 Years
David Cameron	Cascade	30 Years
William Klock	Cascade	35 Years
Joseph R. Von Stein	Cascade	35 Years

Institution Awards

Station	Institution	Length of Service
Fairfield	Greenfield Irrigation District	75 Years
Gibson Dam	Greenfield Irrigation District	75 Years

The NWS is Looking for Volunteers to be SKYWARN Storm Spotters

SKYWARN is a network of trained volunteer severe weather spotters for the National Weather Service. SKYWARN volunteers serve their local communities by providing timely and accurate severe weather reports to the National Weather Service. These reports are used by the National Weather Service to issue timely and accurate warnings of impending hazardous weather.

To become a storm spotter, one must attend a free storm spotting class. Anyone interested should contact Jim Brusda at 406-453-2081.

NWS Great Falls Reference Numbers

Public Service Number: 453-2081
In Helena: 449-5204

Recorded Weather Forecast: 453-5469 or 453-5460
In Cut Bank, Glacier Park, Havre, or Lewistown:
406-453-5469 or 406-453-5460
In Helena: 443-5151

Fax Number: 453-3812

Weather Spotter Hotline: 1-800-932-6694
(Please use to report current weather conditions only.)

On the Internet: www.weather.gov/greatfalls

Email us at: w-gtf.webmaster@noaa.gov

National Weather Service
Forecast Office
5324 Tri-Hill Frontage Rd
Great Falls, MT 59404
Phone: 406-453-2081
Fax: 406-453-3812

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Volunteers Needed!

Some TV and radio stations have asked us for a list of volunteer weather observers who would be willing to talk with them about high and low temperatures, rainfall, and significant or severe weather events. We have not, and will not, give out your names or phone numbers. We are also not allowed to advertise or support any particular station. However, we encourage you to give your local TV or radio stations a call and volunteer your storm spotting and weather observing expertise to them. You may find yourself on TV or radio!